

## SEQUENCE LISTING

&lt;110&gt; Degussa AG

&lt;120&gt; Expression of nitrile hydratases in a two-vector expression system

&lt;130&gt; 040065 AM

&lt;160&gt; 34

&lt;170&gt; PatentIn version 3.1

&lt;210&gt; 1

&lt;211&gt; 624

&lt;212&gt; DNA

&lt;213&gt; Rhodococcus erythropolis

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(624)

&lt;223&gt;

&lt;400&gt; 1

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Lys Gly Leu Val Pro Asp Gly Tyr Val Glu Gly Trp Lys Lys Thr Phe	
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gag gag gac ttc agt cca agg cgc gga gcg gaa ttg gtc gcg cgg gcg	192
Glu Glu Asp Phe Ser Pro Arg Arg Gly Ala Glu Leu Val Ala Arg Ala	
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tgg acc gac ccc gat ttc cgg caa ctg ctt ctc acc gac ggt acc gcc	240
Trp Thr Asp Pro Asp Phe Arg Gln Leu Leu Leu Thr Asp Gly Thr Ala	
65 70 75 80	
gcg gtt gcc cag tac gga tat ctg ggc ccc cag ggc gaa tac atc gtg	288
Ala Val Ala Gln Tyr Gly Tyr Leu Gly Pro Gln Gly Glu Tyr Ile Val	
85 90 95	
gca gtc gaa gac acc ccg acc ctc aag aac gtg atc gtg tgc tcg ctg	336
Ala Val Glu Asp Thr Pro Thr Leu Lys Asn Val Ile Val Cys Ser Leu	
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tgt tca tgc acc gcg tgg ccc att ctc ggc ctg ccc cct acc tgg tac	384
Cys Ser Cys Thr Ala Trp Pro Ile Leu Gly Leu Pro Pro Thr Trp Tyr	
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tac gac acc acc gcc gaa act cgc tac atg gtt ctc ccg caa cgt ccc      528
Tyr Asp Thr Thr Ala Glu Thr Arg Tyr Met Val Leu Pro Gln Arg Pro
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gca ggc acc gaa ggc tgg agc cag gaa cag ctt cag gag atc gtc acc      576
Ala Gly Thr Glu Gly Trp Ser Gln Glu Gln Leu Gln Glu Ile Val Thr
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aag gac tgc ctg atc ggc gtc gca gtc ccg cag gtc ccc acc gtc tga      624
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Trp Thr Asp Pro Asp Phe Arg Gln Leu Leu Leu Thr Asp Gly Thr Ala
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Ala Val Ala Gln Tyr Gly Tyr Leu Gly Pro Gln Gly Glu Tyr Ile Val
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Cys Ser Cys Thr Ala Trp Pro Ile Leu Gly Leu Pro Pro Thr Trp Tyr
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Lys Ser Phe Glu Tyr Arg Ala Arg Val Val Arg Glu Pro Arg Lys Val
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 Glu His Leu Pro Tyr Ser Leu Met Phe Ala Gly Val Ala Glu Leu Gly  
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 Ala Phe Ser Val Asp Glu Val Arg Tyr Val Val Glu Arg Met Glu Pro  
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 Arg His Tyr Met Met Thr Pro Tyr Tyr Glu Arg Tyr Val Ile Gly Val  
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 Ser Leu Ala Gly Gly Pro Phe Pro Leu Ser Arg Pro Ser Glu Ser Glu  
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 Gly Arg Pro Ala Pro Val Glu Thr Thr Thr Phe Glu Ile Gly Gln Arg

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Trp	Pro	Phe	Pro	Asp	Ala	Ile	Gly	His	Gly	Arg	Asn	Asp	Ala	Gly	Glu			
				165					170					175				
gaa	ccg	acg	tac	cac	gtg	aag	ttc	gac	gcc	gag	gaa	ttg	ttc	ggg	agc	576		
Glu	Pro	Thr	Tyr	His	Val	Lys	Phe	Asp	Ala	Glu	Glu	Leu	Phe	Gly	Ser			
			180					185					190					
gac	acc	gac	ggc	ggc	agc	gtc	gta	gtc	gac	ctt	ttc	gag	ggg	tac	ctc	624		
Asp	Thr	Asp	Gly	Gly	Ser	Val	Val	Val	Asp	Leu	Phe	Glu	Gly	Tyr	Leu			
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Glu	Pro	Ala	Ala															
	210																	

&lt;210&gt; 4

&lt;211&gt; 212

&lt;212&gt; PRT

&lt;213&gt; Rhodococcus erythropolis

&lt;400&gt; 4

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Glu	His	Leu	Pro	Tyr	Ser	Leu	Met	Phe	Ala	Gly	Val	Ala	Glu	Leu	Gly
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Ser	Leu	Ala	Gly	Gly	Pro	Phe	Pro	Leu	Ser	Arg	Pro	Ser	Glu	Ser	Glu
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5

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 145 150 155 160  
 Trp Pro Phe Pro Asp Ala Ile Gly His Gly Arg Asn Asp Ala Gly Glu  
 165 170 175  
 Glu Pro Thr Tyr His Val Lys Phe Asp Ala Glu Glu Leu Phe Gly Ser  
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gcg gtt gcc cag tac gga tac ctg ggc ccc cag ggc gag tac atc gtg	288
Ala Val Ala Gln Tyr Gly Tyr Leu Gly Pro Gln Gly Glu Tyr Ile Val	
85 90 95	
gca gtc gaa gac acc ccg acc ctc aag aac gtg atc gtg tgc tcg ctg	336
Ala Val Glu Asp Thr Pro Thr Leu Lys Asn Val Ile Val Cys Ser Leu	
100 105 110	
tgt tca tgc acc gcg tgg ccc att ctc ggc ctg ccc cct acc tgg tac	384
Cys Ser Cys Thr Ala Trp Pro Ile Leu Gly Leu Pro Pro Thr Trp Tyr	
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Lys Ser Phe Glu Tyr Arg Ala Arg Val Val Arg Glu Pro Arg Lys Val	
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Leu Ser Glu Met Gly Thr Glu Ile Ala Ser Asp Val Glu Ile Arg Val	
145 150 155 160	
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Tyr Asp Thr Thr Ala Glu Thr Arg Tyr Met Val Leu Pro Gln Arg Pro	
165 170 175	
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Ala Gly Thr Glu Gly Trp Ser Gln Glu Gln Leu Gln Glu Ile Val Thr	
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85 90 95

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Cys Ser Cys Thr Ala Trp Pro Ile Leu Gly Leu Pro Pro Thr Trp Tyr  
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Pro His Thr Val Asn Ala Asp Ile Gly Pro Thr Phe His Ala Glu Trp  
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gcg aca ctg atg gtc gaa aag gga atc ctg acg cag gat gaa ctc gaa Ala Thr Leu Met Val Glu Lys Gly Ile Leu Thr Gln Asp Glu Leu Glu 85 90 95			288
agc ctt gca ggg gga ccg ttc cca ctg tcg cgg ccc agc gaa tcc gaa Ser Leu Ala Gly Gly Pro Phe Pro Leu Ser Arg Pro Ser Glu Ser Glu 100 105 110			336
ggg cgt ccg gca ccc gtc gag acg acc acc ttc gaa atc ggt cag cga Gly Arg Pro Ala Pro Val Glu Thr Thr Thr Phe Glu Ile Gly Gln Arg 115 120 125			384
gta cgc gtg cgc gac gag tac gtt ccg ggg cat att cga atg cct gcg Val Arg Val Arg Asp Glu Tyr Val Pro Gly His Ile Arg Met Pro Ala 130 135 140			432
tac tgc cgc gga cga gtg gga acc atc tct cat cgg act acc gag aag Tyr Cys Arg Gly Arg Val Gly Thr Ile Ser His Arg Thr Thr Glu Lys 145 150 155 160			480
tgg cca ttt ccc gac gca atc ggc cac ggg cgc aac gac gcc ggc gaa Trp Pro Phe Pro Asp Ala Ile Gly His Gly Arg Asn Asp Ala Gly Glu 165 170 175			528
gaa ccg acg tac cac gtg aag ttc gcc gcc gag gaa ttg ttc ggt agc Glu Pro Thr Tyr His Val Lys Phe Ala Ala Glu Glu Leu Phe Gly Ser 180 185 190			576
gac acc gac ggc ggc agc gtc gta gtc gac ctt ttc gag ggt tac ctc Asp Thr Asp Gly Gly Ser Val Val Val Asp Leu Phe Glu Gly Tyr Leu 195 200 205			624
gag cct gcg gcc tga Glu Pro Ala Ala 210			639

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&lt;211&gt; 212

&lt;212&gt; PRT

&lt;213&gt; Rhodococcus erythropolis

&lt;400&gt; 8

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Arg His Tyr Met Met Thr Pro Tyr Tyr Glu Arg Tyr Val Ile Gly Val		
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Ala Thr Leu Met Val Glu Lys Gly Ile Leu Thr Gln Asp Glu Leu Glu		
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Ser Leu Ala Gly Gly Pro Phe Pro Leu Ser Arg Pro Ser Glu Ser Glu		
100	105	110
Gly Arg Pro Ala Pro Val Glu Thr Thr Thr Phe Glu Ile Gly Gln Arg		
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Val Arg Val Arg Asp Glu Tyr Val Pro Gly His Ile Arg Met Pro Ala		
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Tyr Cys Arg Gly Arg Val Gly Thr Ile Ser His Arg Thr Thr Glu Lys		
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Trp Pro Phe Pro Asp Ala Ile Gly His Gly Arg Asn Asp Ala Gly Glu		
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Glu Pro Thr Tyr His Val Lys Phe Ala Ala Glu Glu Leu Phe Gly Ser		
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Lys Gly Leu Val Pro Asp Gly Tyr Val Glu Gly Trp Lys Lys Thr Phe	
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gag gag gac ttc agt cca agg cgc gga gcg gaa ttg gtc gcg ccg gcg	1 92
Glu Glu Asp Phe Ser Pro Arg Arg Gly Ala Glu Leu Val Ala Arg Ala	
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Trp Thr Asp Pro Glu Phe Arg Gln Leu Leu Leu Thr Asp Gly Thr Ala	
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Ala Val Ala Gln Tyr Gly Tyr Leu Gly Pro Gln Gly Glu Tyr Ile Val	
85 90 95	
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Cys Ser Cys Thr Ala Trp Pro Ile Leu Gly Leu Pro Pro Thr Trp Tyr	
115 120 125	
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Lys Ser Phe Glu Tyr Arg Ala Arg Val Val Arg Glu Pro Arg Lys Val	
130 135 140	
ctc tcc gag atg gga acc gag atc gcg tgc gac gtc gag atc cgc gtc	4 80
Leu Ser Glu Met Gly Thr Glu Ile Ala Ser Asp Val Glu Ile Arg Val	
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Tyr Asp Thr Thr Ala Glu Thr Arg Tyr Met Val Leu Pro Gln Arg Pro	
165 170 175	
gca ggc acc gaa ggc tgg agc cag gaa cag ctt caa gag atc gtc acc	5 76
Ala Gly Thr Glu Gly Trp Ser Gln Glu Gln Leu Gln Glu Ile Val Thr	
180 185 190	
aag gac tgc ctg atc ggc gtc gca gtc ccg cag gtc ccc acc gtc tga	6 24
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&lt;210&gt; 10

&lt;211&gt; 207

&lt;212&gt; PRT

&lt;213&gt; Rhodococcus erythropolis

&lt;400&gt; 10

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 35 40 45

Glu Glu Asp Phe Ser Pro Arg Arg Gly Ala Glu Leu Val Ala Arg Ala  
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Trp Thr Asp Pro Glu Phe Arg Gln Leu Leu Leu Thr Asp Gly Thr Ala  
 65 70 75 80

Ala Val Ala Gln Tyr Gly Tyr Leu Gly Pro Gln Gly Glu Tyr Ile Val  
 85 90 95

Ala Val Glu Asp Thr Pro Thr Leu Lys Asn Val Ile Val Cys Ser Leu  
 100 105 110

Cys Ser Cys Thr Ala Trp Pro Ile Leu Gly Leu Pro Pro Thr Trp Tyr  
 115 120 125

Lys Ser Phe Glu Tyr Arg Ala Arg Val Val Arg Glu Pro Arg Lys Val  
 130 135 140

Leu Ser Glu Met Gly Thr Glu Ile Ala Ser Asp Val Glu Ile Arg Val  
 145 150 155 160

Tyr Asp Thr Thr Ala Glu Thr Arg Tyr Met Val Leu Pro Gln Arg Pro  
 165 170 175

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Lys Asp Cys Leu Ile Gly Val Ala Val Pro Gln Val Pro Thr Val  
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&lt;211&gt; 639

&lt;212&gt; DNA

<213> Rhodococcus erythropolis

<220>

<221> CDS

<222> (1)..(639)

<223>

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Pro His Thr Val Asn Ala Asp Ile Gly Pro Thr Phe His Ala Glu Trp	
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gaa cac ctg ccg tac agc ctg atg ttc gcc ggt gtc gcc gaa ctc ggg	144
Glu His Leu Pro Tyr Ser Leu Met Phe Ala Gly Val Ala Glu Leu Gly	
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Ala Phe Ser Val Asp Glu Val Arg Tyr Val Val Glu Arg Met Glu Pro	
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cgc cac tac atg atg acc ccg tac tac gag agg tac gtc atc ggc gtc	240
Arg His Tyr Met Met Thr Pro Tyr Tyr Glu Arg Tyr Val Ile Gly Val	
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gcg aca ctg atg gtc gaa aag gga atc ctg acg cag gaa gaa ctc gaa	288
Ala Thr Leu Met Val Glu Lys Gly Ile Leu Thr Gln Glu Glu Leu Glu	
85 90 95	
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Ser Leu Ala Gly Gly Pro Phe Pro Leu Ser Arg Pro Ser Glu Ser Glu	
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Gly Arg Pro Ala Pro Val Glu Thr Thr Thr Phe Glu Val Gly Gln Arg	
115 120 125	
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Val Arg Val Arg Asp Glu Tyr Val Pro Gly His Ile Arg Met Pro Ala	
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Tyr Cys Arg Gly Arg Val Gly Thr Ile Ser His Arg Thr Thr Glu Lys	
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Trp Pro Phe Pro Asp Ala Ile Gly His Gly Arg Asn Asp Ala Gly Glu	
165 170 175	
gaa ccg acg tac cac gtg aag ttc gac gcc gag gaa ttg ttc ggt agc	576
Glu Pro Thr Tyr His Val Lys Phe Asp Ala Glu Glu Leu Phe Gly Ser	
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gac acc gac ggc ggc agc gtc gta gtc gac ctt ttc gag ggt tac ctc	624
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 50 55 60

Arg His Tyr Met Met Thr Pro Tyr Tyr Glu Arg Tyr Val Ile Gly Val  
 65 70 75 80

Ala Thr Leu Met Val Glu Lys Gly Ile Leu Thr Gln Glu Glu Leu Glu  
 85 90 95

Ser Leu Ala Gly Gly Pro Phe Pro Leu Ser Arg Pro Ser Glu Ser Glu  
 100 105 110

Gly Arg Pro Ala Pro Val Glu Thr Thr Thr Phe Glu Val Gly Gln Arg  
 115 120 125

Val Arg Val Arg Asp Glu Tyr Val Pro Gly His Ile Arg Met Pro Ala  
 130 135 140

Tyr Cys Arg Gly Arg Val Gly Thr Ile Ser His Arg Thr Thr Glu Lys  
 145 150 155 160

Trp Pro Phe Pro Asp Ala Ile Gly His Gly Arg Asn Asp Ala Gly Glu  
 165 170 175

Glu Pro Thr Tyr His Val Lys Phe Asp Ala Glu Glu Leu Phe Gly Ser  
 180 185 190

Asp Thr Asp Gly Gly Ser Val Val Val Asp Leu Phe Glu Gly Tyr Leu  
 195 200 205

Glu Pro Ala Ala  
 210

<210> 13  
 <211> 612  
 <212> DNA  
 <213> Rhodococcus erythropolis

<220>  
 <221> CDS  
 <222> (1)..(612)  
 <223>

<400> 13  
 gtg agc gag cac gtc aat aag tac acg gag tac gag gca cgt acc aag 48  
 Val Ser Glu His Val Asn Lys Tyr Thr Glu Tyr Glu Ala Arg Thr Lys  
 1 5 10 15  
 gca atc gaa act ttg ctg tac gag cga ggg ctc atc acg ccc gcc gcg 96  
 Ala Ile Glu Thr Leu Leu Tyr Glu Arg Gly Leu Ile Thr Pro Ala Ala  
 20 25 30  
 gtc gac cga gtc gtt tcg tac tac gag aac gag atc ggc ccg atg ggc 144  
 Val Asp Arg Val Val Ser Tyr Tyr Glu Asn Glu Ile Gly Pro Met Gly  
 35 40 45  
 ggt gcc aag gtc gtg gcg aag tcc tgg gtg gac cct gag tac cgc aag 192  
 Gly Ala Lys Val Val Ala Lys Ser Trp Val Asp Pro Glu Tyr Arg Lys  
 50 55 60  
 tgg ctc gaa gag gac gcg acg gcc gcg atg gcg tca ttg ggc tat gcc 240  
 Trp Leu Glu Glu Asp Ala Thr Ala Ala Met Ala Ser Leu Gly Tyr Ala  
 65 70 75 80  
 ggt gag cag gca cac caa att tcg gcg gtc ttc aac gac tcc caa acg 288  
 Gly Glu Gln Ala His Gln Ile Ser Ala Val Phe Asn Asp Ser Gln Thr  
 85 90 95  
 cat cac gtg gtg gtg tgc act ctg tgt tcg tgc tat ccg tgg ccg gtg 336  
 His His Val Val Val Cys Thr Leu Cys Ser Cys Tyr Pro Trp Pro Val  
 100 105 110  
 ctt ggt ctc ccg ccc gcc tgg tac aag agc atg gag tac ccg tcc cga 384  
 Leu Gly Leu Pro Pro Ala Trp Tyr Lys Ser Met Glu Tyr Arg Ser Arg  
 115 120 125  
 gtg gta gcg gac cct cgt gga gtg ctc aag cgc gat ttc ggt ttc gac 432  
 Val Val Ala Asp Pro Arg Gly Val Leu Lys Arg Asp Phe Gly Phe Asp  
 130 135 140  
 atc ccc gat gag gtg gag gtc agg gtt tgg gac agc agc tcc gaa atc 480  
 Ile Pro Asp Glu Val Glu Val Arg Val Trp Asp Ser Ser Ser Glu Ile

15

145	150	155	160	
cgc tac atc gtc atc ccg gaa cgg ccg gcc ggc acc gac ggt tgg tcc				528
Arg Tyr Ile Val Ile Pro Glu Arg Pro Ala Gly Thr Asp Gly Trp Ser	165	170	175	
gag gac gag ctg gcg aag ctg gtg agt cgg gac tcg atg atc ggt gtc				576
Glu Asp Glu Leu Ala Lys Leu Val Ser Arg Asp Ser Met Ile Gly Val	180	185	190	
agt aat gcg ctc aca ccc cag gaa gtg atc gta tga				612
Ser Asn Ala Leu Thr Pro Gln Glu Val Ile Val	195	200		

<210> 14  
 <211> 203  
 <212> PRT  
 <213> Rhodococcus erythropolis

<400> 14

Val Ser Glu His Val Asn Lys Tyr Thr Glu Tyr Glu Ala Arg Thr Lys
1 5 10 15

Ala Ile Glu Thr Leu Leu Tyr Glu Arg Gly Leu Ile Thr Pro Ala Ala
20 25 30

Val Asp Arg Val Val Ser Tyr Tyr Glu Asn Glu Ile Gly Pro Met Gly
35 40 45

Gly Ala Lys Val Val Ala Lys Ser Trp Val Asp Pro Glu Tyr Arg Lys
50 55 60

Trp Leu Glu Glu Asp Ala Thr Ala Ala Met Ala Ser Leu Gly Tyr Ala
65 70 75 80

Gly Glu Gln Ala His Gln Ile Ser Ala Val Phe Asn Asp Ser Gln Thr
85 90 95

His His Val Val Val Cys Thr Leu Cys Ser Cys Tyr Pro Trp Pro Val
100 105 110

Leu Gly Leu Pro Pro Ala Trp Tyr Lys Ser Met Glu Tyr Arg Ser Arg
115 120 125

Val Val Ala Asp Pro Arg Gly Val Leu Lys Arg Asp Phe Gly Phe Asp
130 135 140

Ile Pro Asp Glu Val Glu Val Arg Val Trp Asp Ser Ser Ser Glu Ile

145					150					155						160
Arg	Tyr	Ile	Val	Ile	Pro	Glu	Arg	Pro	Ala	Gly	Thr	Asp	Gly	Trp	Ser	
				165					170					175		
Glu	Asp	Glu	Leu	Ala	Lys	Leu	Val	Ser	Arg	Asp	Ser	Met	Ile	Gly	Val	
			180					185					190			
Ser	Asn	Ala	Leu	Thr	Pro	Gln	Glu	Val	Ile	Val						
		195					200									

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<210> 15
<211> 690
<212> DNA
<213> Rhodococcus erythropolis
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<220>
<221> CDS
<222> (1) .. (690)
<223>
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Met	Asp	Gly	Ile	His	Asp	Thr	Gly	Gly	Met	Thr	Gly	Tyr	Gly	Pro	Val	
1				5					10					15		
ccc	tat	cag	aag	gac	gag	ccc	ttc	ttc	cac	tac	gag	tgg	gag	ggt	cgg	96
Pro	Tyr	Gln	Lys	Asp	Glu	Pro	Phe	Phe	His	Tyr	Glu	Trp	Glu	Gly	Arg	
			20					25					30			
acc	ctg	tcg	att	ctg	acc	tgg	atg	cat	ctc	aag	ggc	atg	tcg	tgg	tgg	144
Thr	Leu	Ser	Ile	Leu	Thr	Trp	Met	His	Leu	Lys	Gly	Met	Ser	Trp	Trp	
		35					40					45				
gac	aag	tcg	cgg	ttc	ttc	cgg	gag	tcg	atg	ggg	aac	gaa	aac	tac	gtc	192
Asp	Lys	Ser	Arg	Phe	Phe	Arg	Glu	Ser	Met	Gly	Asn	Glu	Asn	Tyr	Val	
	50					55					60					
aac	gag	att	cgc	aac	tcg	tac	tac	acc	cac	tgg	ctg	agt	gcg	gca	gaa	240
Asn	Glu	Ile	Arg	Asn	Ser	Tyr	Tyr	Thr	His	Trp	Leu	Ser	Ala	Ala	Glu	
65					70					75					80	
cgt	atc	ctc	gtc	gcc	gac	aag	atc	atc	acc	gaa	gaa	gag	cga	aag	cac	288
Arg	Ile	Leu	Val	Ala	Asp	Lys	Ile	Ile	Thr	Glu	Glu	Glu	Arg	Lys	His	
				85					90					95		
cgt	gtg	cag	gag	atc	ctc	gag	ggg	cgg	tac	acg	gac	agg	aac	ccg	tcg	336
Arg	Val	Gln	Glu	Ile	Leu	Glu	Gly	Arg	Tyr	Thr	Asp	Arg	Asn	Pro	Ser	
			100					105					110			
cgg	aag	ttc	gat	ccg	gcc	gag	atc	gag	aag	gcg	atc	gaa	cgg	ctt	cac	384
Arg	Lys	Phe	Asp	Pro	Ala	Glu	Ile	Glu	Lys	Ala	Ile	Glu	Arg	Leu	His	
		115					120					125				

gag ccc cac tcc cta gca ctt cca gga gcg gag ccg agt ttc tcc ctc 432  
 Glu Pro His Ser Leu Ala Leu Pro Gly Ala Glu Pro Ser Phe Ser Leu  
 130 135 140

ggt gac aag gtc aaa gtg aag aat atg aac ccg ctg gga cac aca cgg 480  
 Gly Asp Lys Val Lys Val Lys Asn Met Asn Pro Leu Gly His Thr Arg  
 145 150 155 160

tgc ccg aaa tat gtg cgg aac aag atc ggg gaa atc gtc acc tcc cac 528  
 Cys Pro Lys Tyr Val Arg Asn Lys Ile Gly Glu Ile Val Thr Ser His  
 165 170 175

ggc tgc cag atc tat ccc gag agc agc tcc gcc ggc ctc ggc gac gat 576  
 Gly Cys Gln Ile Tyr Pro Glu Ser Ser Ser Ala Gly Leu Gly Asp Asp  
 180 185 190

ccc cgc ccg ctc tac acg gtc gcg ttt tcc gcc cag gaa ctg tgg ggc 624  
 Pro Arg Pro Leu Tyr Thr Val Ala Phe Ser Ala Gln Glu Leu Trp Gly  
 195 200 205

gac gac gga aac ggg aaa gac gta gtg tgc gtc gat ctc tgg gaa ccg 672  
 Asp Asp Gly Asn Gly Lys Asp Val Val Cys Val Asp Leu Trp Glu Pro  
 210 215 220

tac ctg atc tct gcg tga 690  
 Tyr Leu Ile Ser Ala  
 225

<210> 16  
 <211> 229  
 <212> PRT  
 <213> Rhodococcus erythropolis

<400> 16

Met Asp Gly Ile His Asp Thr Gly Gly Met Thr Gly Tyr Gly Pro Val  
 1 5 10 15

Pro Tyr Gln Lys Asp Glu Pro Phe Phe His Tyr Glu Trp Glu Gly Arg  
 20 25 30

Thr Leu Ser Ile Leu Thr Trp Met His Leu Lys Gly Met Ser Trp Trp  
 35 40 45

Asp Lys Ser Arg Phe Phe Arg Glu Ser Met Gly Asn Glu Asn Tyr Val  
 50 55 60

Asn Glu Ile Arg Asn Ser Tyr Tyr Thr His Trp Leu Ser Ala Ala Glu  
 65 70 75 80

Arg Ile Leu Val Ala Asp Lys Ile Ile Thr Glu Glu Glu Arg Lys His  
 85 90 95

18

Arg Val Gln Glu Ile Leu Glu Gly Arg Tyr Thr Asp Arg Asn Pro Ser  
 100 105 110

Arg Lys Phe Asp Pro Ala Glu Ile Glu Lys Ala Ile Glu Arg Leu His  
 115 120 125

Glu Pro His Ser Leu Ala Leu Pro Gly Ala Glu Pro Ser Phe Ser Leu  
 130 135 140

Gly Asp Lys Val Lys Val Lys Asn Met Asn Pro Leu Gly His Thr Arg  
 145 150 155 160

Cys Pro Lys Tyr Val Arg Asn Lys Ile Gly Glu Ile Val Thr Ser His  
 165 170 175

Gly Cys Gln Ile Tyr Pro Glu Ser Ser Ser Ala Gly Leu Gly Asp Asp  
 180 185 190

Pro Arg Pro Leu Tyr Thr Val Ala Phe Ser Ala Gln Glu Leu Trp Gly  
 195 200 205

Asp Asp Gly Asn Gly Lys Asp Val Val Cys Val Asp Leu Trp Glu Pro  
 210 215 220

Tyr Leu Ile Ser Ala  
 225

<210> 17  
 <211> 22  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer

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 gcccgcataa gaaaagggtga ac

22

<210> 18  
 <211> 21  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer

<400> 18

19

gcatgccttc aaatcagcct g

21

&lt;210&gt; 19

&lt;211&gt; 24

&lt;212&gt; DNA

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; Primer

&lt;400&gt; 19

aggggtgaacc atatgtcagt aacg

24

&lt;210&gt; 20

&lt;211&gt; 22

&lt;212&gt; DNA

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; Primer

&lt;400&gt; 20

tgtcggatcc atcagacggt gg

22

&lt;210&gt; 21

&lt;211&gt; 23

&lt;212&gt; DNA

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; Primer

&lt;400&gt; 21

agcaccatat ggatggagta cac

23

&lt;210&gt; 22

&lt;211&gt; 21

&lt;212&gt; DNA

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; Primer

&lt;400&gt; 22

gttgggaatt caggccgcag g

21

&lt;210&gt; 23

&lt;211&gt; 27

&lt;212&gt; DNA

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; Primer

<400> 23  
cgcggatcca agaaggagat atacatg 27

<210> 24  
<211> 22  
<212> DNA  
<213> Artificial

<220>  
<223> Primer

<400> 24  
ccgcaacggtt caaacggtct gg 22

<210> 25  
<211> 27  
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<220>  
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<400> 25  
aggaatacgc atatgagcga gcacgtc 27

<210> 26  
<211> 30  
<212> DNA  
<213> Artificial

<220>  
<223> Primer

<400> 26  
gtgtggatcc actcatacga tcacttcctg 30

<210> 27  
<211> 31  
<212> DNA  
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<220>  
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<400> 27  
aggaatgagc atatggatgg tatccacgac a 31

<210> 28  
<211> 33  
<212> DNA  
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<220>  
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<400> 28  
 atcgggatcc tttcacgcag agatcaggta cgg 33

<210> 29  
 <211> 35  
 <212> DNA  
 <213> Artificial

<220>  
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<400> 29  
 ctcaggatcc aaggagtgat cgtatgagtg aagac 35

<210> 30  
 <211> 26  
 <212> DNA  
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<220>  
 <223> Primer

<400> 30  
 acaggagctc tcagtcgatg atggcc 26

<210> 31  
 <211> 315  
 <212> DNA  
 <213> Rhodococcus erythropolis

<220>  
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 <222> (1)..(315)  
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<400> 31  
 atg agt gaa gac aca ctc act gat cgg ctc ccg gcg act ggg acc gcc 48  
 Met Ser Glu Asp Thr Leu Thr Asp Arg Leu Pro Ala Thr Gly Thr Ala  
 1 5 10 15

gca ccg ccc cgc gac aat ggc gag ctt gta ttc acc gag cct tgg gaa 96  
 Ala Pro Pro Arg Asp Asn Gly Glu Leu Val Phe Thr Glu Pro Trp Glu  
 20 25 30

gca acg gca ttc ggg gtc gcc atc gcg ctt tcg gat cag aag tcg tac 144  
 Ala Thr Ala Phe Gly Val Ala Ile Ala Leu Ser Asp Gln Lys Ser Tyr  
 35 40 45

gaa tgg gag ttc ttc cga cag cgt ctc att cac tcc atc gct gag gcc 192  
 Glu Trp Glu Phe Phe Arg Gln Arg Leu Ile His Ser Ile Ala Glu Ala  
 50 55 60

aac ggt tgc gag gca tac tac gag agc tgg aca aag gcg ctc gag gcc 240  
 Asn Gly Cys Glu Ala Tyr Tyr Glu Ser Trp Thr Lys Ala Leu Glu Ala  
 65 70 75 80

agc gtg gtc gac tcg ggg ctg atc agc gaa gat gag atc cgc gag cgc 288  
Ser Val Val Asp Ser Gly Leu Ile Ser Glu Asp Glu Ile Arg Glu Arg  
85 90 95

atg gaa tcg atg gcc atc atc gac tga 315  
Met Glu Ser Met Ala Ile Ile Asp  
100

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<210> 32
<211> 104
<212> PRT
<213> Rhodococcus erythropolis
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<400> 32

Met Ser Glu Asp Thr Leu Thr Asp Arg Leu Pro Ala Thr Gly Thr Ala  
1 5 10 15

Ala Pro Pro Arg Asp Asn Gly Glu Leu Val Phe Thr Glu Pro Trp Glu  
20 25 30

Ala Thr Ala Phe Gly Val Ala Ile Ala Leu Ser Asp Gln Lys Ser Tyr  
35 40 45

Glu Trp Glu Phe Phe Arg Gln Arg Leu Ile His Ser Ile Ala Glu Ala  
50 55 60

Asn Gly Cys Glu Ala Tyr Tyr Glu Ser Trp Thr Lys Ala Leu Glu Ala  
65 70 75 80

Ser Val Val Asp Ser Gly Leu Ile Ser Glu Asp Glu Ile Arg Glu Arg  
85 90 95

Met Glu Ser Met Ala Ile Ile Asp  
100

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<210> 33
<211> 1200
<212> DNA
<213> Rhodococcus erythropolis
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<220>
<221> CDS
<222> (1) .. (1200)
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<400> 33
atg gtc gac aca cga ctt ccg gtc acg gtg ctg tca ggt ttc ctg ggc      48
Met Val Asp Thr Arg Leu Pro Val Thr Val Leu Ser Gly Phe Leu Gly
1          5          10          15
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gcc ggg aag acg aca cta ctc aac gag atc ctg cga aat cga gag ggt Ala Gly Lys Thr Thr Leu Leu Asn Glu Ile Leu Arg Asn Arg Glu Gly 20 25 30	96
cgg cgg gtc gcg gtg atc gtc aac gac atg agc gaa atc aac atc gac Arg Arg Val Ala Val Ile Val Asn Asp Met Ser Glu Ile Asn Ile Asp 35 40 45	144
agt gca gaa gtc gag cgt gag atc tcg ctc agt cgc tcc gag gag aaa Ser Ala Glu Val Glu Arg Glu Ile Ser Leu Ser Arg Ser Glu Glu Lys 50 55 60	192
ctg gtc gag atg acc aac ggc tgc atc tgc tgc act ctg cga gag gat Leu Val Glu Met Thr Asn Gly Cys Ile Cys Cys Thr Leu Arg Glu Asp 65 70 75 80	240
ctt ctt tcc gag atc agc gcc ttg gcc gcc gat ggc cga ttc gac tac Leu Leu Ser Glu Ile Ser Ala Leu Ala Ala Asp Gly Arg Phe Asp Tyr 85 90 95	288
cta ctc atc gaa tct tcg ggc atc tcc gaa ccg ctt ccc gtc gca gag Leu Leu Ile Glu Ser Ser Gly Ile Ser Glu Pro Leu Pro Val Ala Glu 100 105 110	336
acg ttc aca ttc atc gat acc gac ggc cac gcc ctc gcc gac gtc gcc Thr Phe Thr Phe Ile Asp Thr Asp Gly His Ala Leu Ala Asp Val Ala 115 120 125	384
cga ctc gac acc atg gtc acc gtc gtc gac ggc cac agt ttt ctg cgc Arg Leu Asp Thr Met Val Thr Val Val Asp Gly His Ser Phe Leu Arg 130 135 140	432
gac tac acg gct ggg ggc cgc gtc gaa gcc gat gcc ccg gaa gac gaa Asp Tyr Thr Ala Gly Arg Val Glu Ala Asp Ala Pro Glu Asp Glu 145 150 155 160	480
cga gac atc gcg gat ctg ctt gtc gat cag atc gaa ttt gcc gac gtc Arg Asp Ile Ala Asp Leu Leu Val Asp Gln Ile Glu Phe Ala Asp Val 165 170 175	528
atc ctg gtg agc aag gcc gat ctc gtc tcg cac cag cac ctg gtc gaa Ile Leu Val Ser Lys Ala Asp Leu Val Ser His Gln His Leu Val Glu 180 185 190	576
ttg acc gca gtc ctg cgc tct ttg aac gca tcc gct gcg ata gtt ccg Leu Thr Ala Val Leu Arg Ser Leu Asn Ala Ser Ala Ala Ile Val Pro 195 200 205	624
atg acg ctc ggt cgc atc cca ctc gac acg att ctc gac acc ggt ttg Met Thr Leu Gly Arg Ile Pro Leu Asp Thr Ile Leu Asp Thr Gly Leu 210 215 220	672
ttc tcg ctc gaa aag gct gca cag gcc ccc gga tgg tta caa gaa ctc Phe Ser Leu Glu Lys Ala Ala Gln Ala Pro Gly Trp Leu Gln Glu Leu 225 230 235 240	720
caa ggt gaa cac atc ccc gaa acc gaa gag tac gga atc agt tcg gtg Gln Gly Glu His Ile Pro Glu Thr Glu Glu Tyr Gly Ile Ser Ser Val 245 250 255 260	768

24

	245	250	255	
gtg tac cgc gag cgc gca ccc ttc cac ccc caa cgg ctg cat gat ttc				816
Val Tyr Arg Glu Arg Ala Pro Phe His Pro Gln Arg Leu His Asp Phe				
	260	265	270	
ctc agc agc gag tgg acc aac gga aag tta ctt cgg gcc aag ggc tac				864
Leu Ser Ser Glu Trp Thr Asn Gly Lys Leu Leu Arg Ala Lys Gly Tyr				
	275	280	285	
tac tgg aat gcc ggc cgg ttc acc gag atc ggg agt att tct cag gcc				912
Tyr Trp Asn Ala Gly Arg Phe Thr Glu Ile Gly Ser Ile Ser Gln Ala				
	290	295	300	
ggt cat ctc att cgc cac gga tac gtc ggc cgt tgg tgg aag ttt cta				960
Gly His Leu Ile Arg His Gly Tyr Val Gly Arg Trp Trp Lys Phe Leu				
	305	310	315	320
ccc cgt gac gag tgg ccg gcc gac gat tac cgt cgt gac gga atc ctc				1008
Pro Arg Asp Glu Trp Pro Ala Asp Asp Tyr Arg Arg Asp Gly Ile Leu				
	325	330	335	
gac aag tgg gaa gaa ccc gtc gga gac tgc cga caa gaa ctc gtc ttc				1056
Asp Lys Trp Glu Glu Pro Val Gly Asp Cys Arg Gln Glu Leu Val Phe				
	340	345	350	
atc ggc caa gcc atc gac ccg tct cga ctg cac cga gaa ctc gac gcg				1104
Ile Gly Gln Ala Ile Asp Pro Ser Arg Leu His Arg Glu Leu Asp Ala				
	355	360	365	
tgt cta ctc acc aca gcc gag atc gaa ctc ggg cca gac gtg tgg acc				1152
Cys Leu Leu Thr Thr Ala Glu Ile Glu Leu Gly Pro Asp Val Trp Thr				
	370	375	380	
acc tgg agc gac ccc ctg ggc gtc ggc tat acc gac cag acc gtt tga				1200
Thr Trp Ser Asp Pro Leu Gly Val Gly Tyr Thr Asp Gln Thr Val				
	385	390	395	

&lt;210&gt; 34

&lt;211&gt; 399

&lt;212&gt; PRT

&lt;213&gt; Rhodococcus erythropolis

&lt;400&gt; 34

Met Val Asp Thr Arg Leu Pro Val Thr Val Leu Ser Gly Phe Leu Gly
1 5 10 15

Ala Gly Lys Thr Thr Leu Leu Asn Glu Ile Leu Arg Asn Arg Glu Gly
20 25 30

Arg Arg Val Ala Val Ile Val Asn Asp Met Ser Glu Ile Asn Ile Asp
35 40 45

Ser Ala Glu Val Glu Arg Glu Ile Ser Leu Ser Arg Ser Glu Glu Lys

25

50		55		60
Leu Val Glu Met Thr Asn Gly Cys Ile Cys Cys Thr Leu Arg Glu Asp				
65		70		75
				80
Leu Leu Ser Glu Ile Ser Ala Leu Ala Ala Asp Gly Arg Phe Asp Tyr				
	85		90	95
Leu Leu Ile Glu Ser Ser Gly Ile Ser Glu Pro Leu Pro Val Ala Glu				
	100		105	110
Thr Phe Thr Phe Ile Asp Thr Asp Gly His Ala Leu Ala Asp Val Ala				
	115		120	125
Arg Leu Asp Thr Met Val Thr Val Val Asp Gly His Ser Phe Leu Arg				
	130		135	140
Asp Tyr Thr Ala Gly Gly Arg Val Glu Ala Asp Ala Pro Glu Asp Glu				
145		150		155
				160
Arg Asp Ile Ala Asp Leu Leu Val Asp Gln Ile Glu Phe Ala Asp Val				
	165		170	175
Ile Leu Val Ser Lys Ala Asp Leu Val Ser His Gln His Leu Val Glu				
	180		185	190
Leu Thr Ala Val Leu Arg Ser Leu Asn Ala Ser Ala Ala Ile Val Pro				
	195		200	205
Met Thr Leu Gly Arg Ile Pro Leu Asp Thr Ile Leu Asp Thr Gly Leu				
210		215		220
Phe Ser Leu Glu Lys Ala Ala Gln Ala Pro Gly Trp Leu Gln Glu Leu				
225		230		235
				240
Gln Gly Glu His Ile Pro Glu Thr Glu Glu Tyr Gly Ile Ser Ser Val				
	245		250	255
Val Tyr Arg Glu Arg Ala Pro Phe His Pro Gln Arg Leu His Asp Phe				
	260		265	270
Leu Ser Ser Glu Trp Thr Asn Gly Lys Leu Leu Arg Ala Lys Gly Tyr				
	275		280	285

Tyr Trp Asn Ala Gly Arg Phe Thr Glu Ile Gly Ser Ile Ser Gln Ala  
290 295 300

Gly His Leu Ile Arg His Gly Tyr Val Gly Arg Trp Trp Lys Phe Leu  
305 310 315 320

Pro Arg Asp Glu Trp Pro Ala Asp Asp Tyr Arg Arg Asp Gly Ile Leu  
325 330 335

Asp Lys Trp Glu Glu Pro Val Gly Asp Cys Arg Gln Glu Leu Val Phe  
340 345 350

Ile Gly Gln Ala Ile Asp Pro Ser Arg Leu His Arg Glu Leu Asp Ala  
355 360 365

Cys Leu Leu Thr Thr Ala Glu Ile Glu Leu Gly Pro Asp Val Trp Thr  
370 375 380

Thr Trp Ser Asp Pro Leu Gly Val Gly Tyr Thr Asp Gln Thr Val  
385 390 395